

III. SKELETAL SYSTEM

CERVICAL AND THORACIC VERTEBRAE

22

See 21, 23

Use red for M and use the same colors as were used on Plate 21 and T. Use dark colors for N, O, and P. (1) Begin with the parts of a cervical vertebra. Color the atlas and axis and note they have been given separate colors to distinguish them from other cervical vertebrae. (2) Color the parts of a thoracic vertebra and then the thoracic portion of the vertebral column. Note the three different facet/demifacet colors.

CERVICAL VERTEBRA

BODY^C

PEDICLE^B

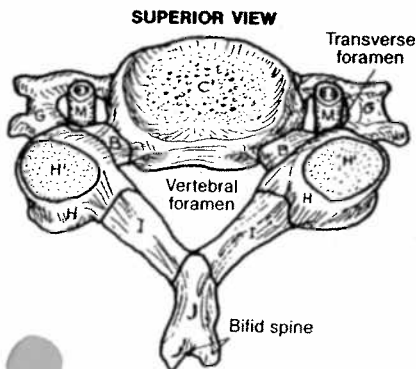
TRANSVERSE PROCESS^C

ARTICULAR PROCESS^H

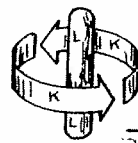
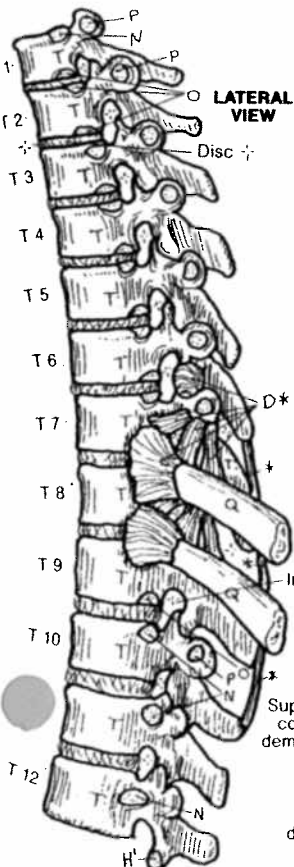
FACET^H

LAMINA^I

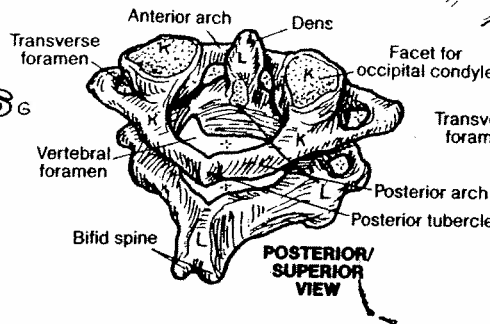
SPINOUS PROCESS^J



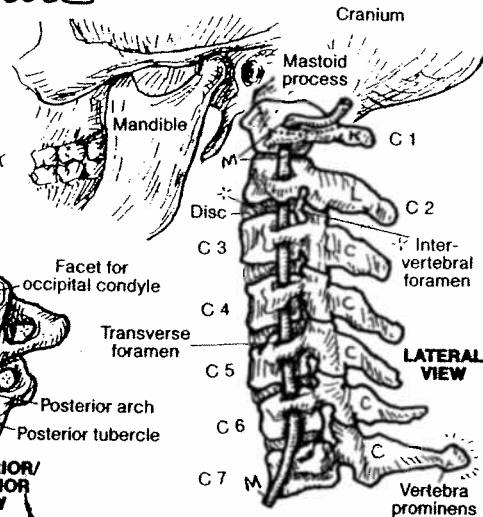
TYPICAL CERVICAL (C4) VERTEBRA



ATLAS^K
AXIS^L



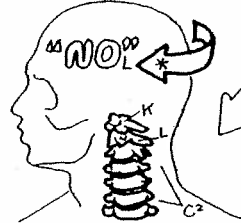
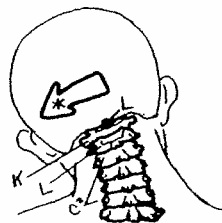
POSTERIOR/
SUPERIOR
VIEW



LATERAL
VIEW

VERTEBRAL
ARTERY^M

MOVEMENT^{*}



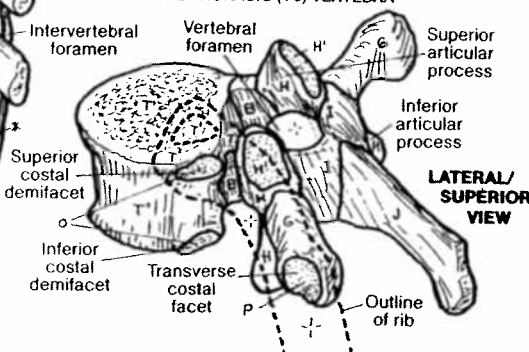
ROTATION

FLEXION/EXTENSION

The small seven *cervical vertebrae* support and move the head and neck, supported by ligaments and strap-like paracervical (paraspinal) muscles. The ring-shaped *atlas* (C1) has no body; thus there are no weight-bearing discs between the occiput and C1, and between C1 and C2 (the *axis*). Head weight is transferred to C3 by the large *articular processes* and *facets* of C1 and C2. The atlantooccipital joints, in conjunction with the C3-C7 facet joints, permit a remarkable degree of flexion/extension ("yes" movements). The dens of C2 projects into the anterior part of the C1 ring, forming a pivot joint, enabling the head and C1 to rotate almost 90° ("no" movements). Such rotational capacity is permitted by the relatively horizontal orientation of the cervical facets. The C3-C6 vertebrae are similar; C7 is remarkable for its prominent *spinous process*, easily palpated. The anteriorly directed cervical curve and the extensive paracervical musculature preclude palpation of the other cervical spinous processes. The *vertebral arteries*, enroute to the brain stem, pass through foramina of the *transverse processes* of the upper six cervical vertebrae. These vessels are subject to stretching injuries with extreme cervical rotation of the hyperextended neck. The cervical vertebral canal conducts the cervical spinal cord and its coverings (not shown). The C4-5 and C5-6 motion segments are the most mobile of the cervical region and are particularly prone to disc/facet degeneration.

The twelve *thoracic vertebrae*—characterized by long, slender spinous processes, heart-shaped *bodies*, and nearly vertically oriented *facets*—articulate with *ribs* bilaterally. In general, each rib forms a synovial joint with two *demifacets* on the bodies of adjacent vertebrae and a single *facet* on the transverse process of the lower vertebra. Variations of these costovertebral joints are seen with T1, T11, and T12.

TYPICAL THORACIC (T5) VERTEBRA



THORACIC VERTEBRA^T

BODY^T

FACET^N

DEMIFACET.

TRANSVERSE FACET^P

RIB^Q

LIGAMENT^{D*}

III. SKELETAL SYSTEM

LUMBAR, SACRAL, & COCCYGEAL VERTEBRAE

CN: Use the same colors as were used on the previous two plates for C, T, L, E, F, A, S, and Co. (1) Begin with the three large views of lumbar vertebrae. (2) Color the different planes of articular facets. (3) Color the four views of the sacrum and coccyx. Note that the central portion of the median section receives the vertebral canal color (E').

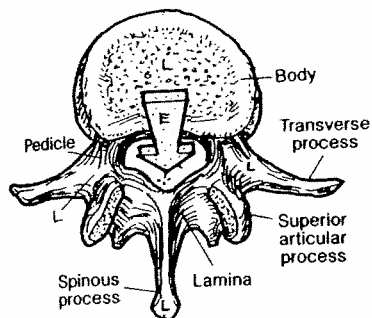
LUMBAR VERTEBRA L

VERTEBRAL FORAMEN F

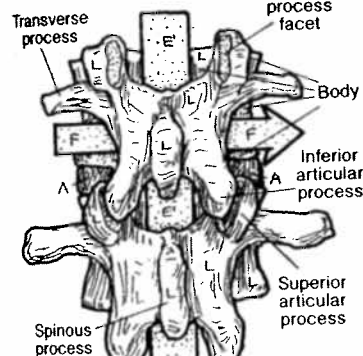
VERTEBRAL CANAL E'

INTERVERTEBRAL FORAMEN F

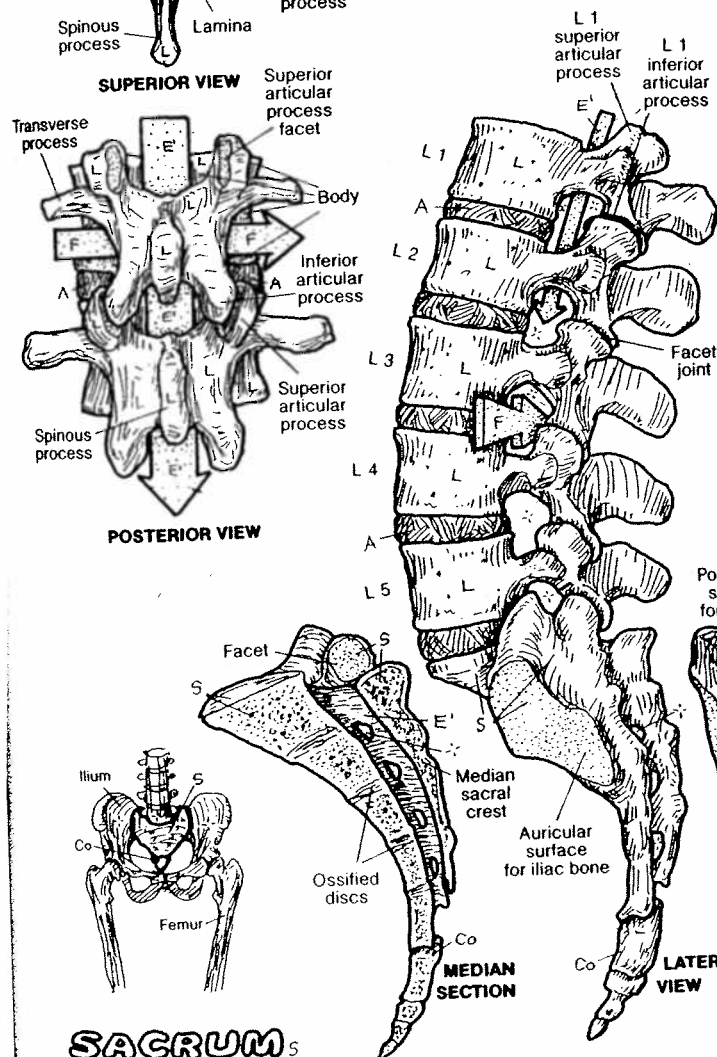
INTERVERTEBRAL DISC A



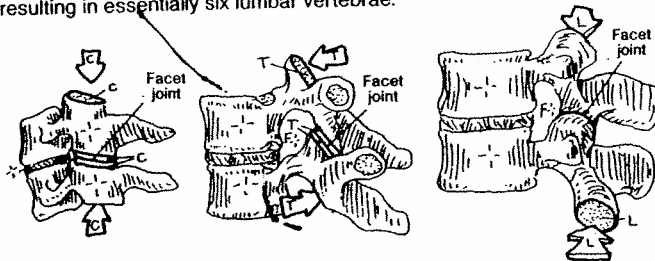
SUPERIOR VIEW



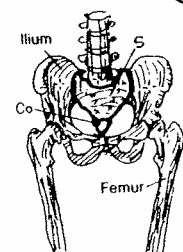
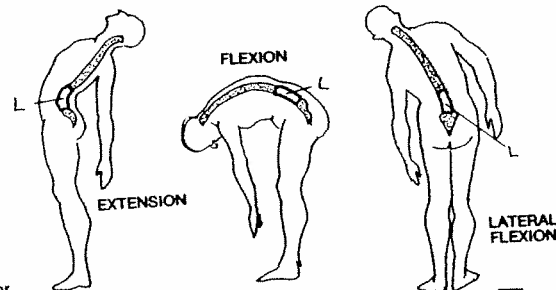
POSTERIOR VIEW



PLANES OF ARTICULAR FACETS: CERVICAL C THORACIC T LUMBAR L

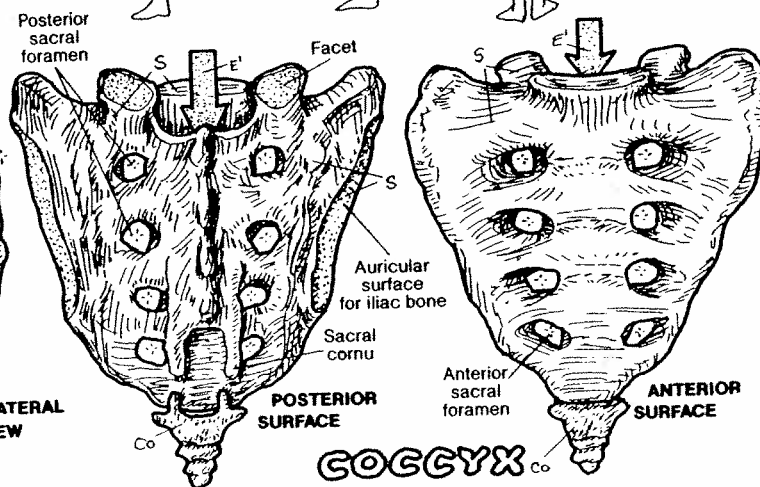


The planes (orientation) of the articular facets determine the direction and influence the degree of motion segment movement. The plane of the *cervical* facets is angled coronally off the horizontal plane about 30°. Considerable freedom of movement of the cervical spine is permitted in all planes (sagittal, coronal, horizontal). The *thoracic* facets lie more vertically in the coronal plane, and are virtually non-weightbearing. The range of motion here is significantly limited in all planes, less so in rotation. The plane of the *lumbar* facets is largely sagittal, resisting rotation of the lumbar spine, transitioning to a more coronal orientation at L5-S1. The L4-L5 facet joints permit the greatest degree of lumbar motion in all planes.



SACRUM S

The *sacrum* consists of five fused vertebrae; the intervertebral discs are largely replaced by bone. The sacral (vertebral) canal contains the terminal sac of the dura mater (dural sac, thecal sac) to S2 and the sacral nerve roots, which transit the sacral foramina. The sacrum joins with the ilium of the hip bone at the auricular surface, forming the sacroiliac joint.



The sacrum and the ilia of the hip bones form an arch for the transmission and distribution of weightbearing forces to the heads of the femora. It is a strong arch, and the sacrum is its keystone. The coccyx consists of 2-4 tiny individual or partly fused, rudimentary vertebrae. The first coccygeal vertebra is the most completely developed.